

FLIGHT

The
**AIRCRAFT
ENGINEER
&
AIRSHIPS**

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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EDITORIAL COMMENT.



IN our issue of February 21, in commenting on the Labour Government's air policy, and particularly on the fatuous speech in the House of Commons by the Under-Secretary of State for Air, Mr. Leach, we expressed the opinion that the Air Minister, Lord Thomson, would not, unless we had formed an entirely wrong impression of him, subscribe to some of the statements made by Mr. Leach. The statement by the Secretary of State for Air in the House of Lords on March 4 appears to bear out our contention, and to show that the new Air Minister, although a member of the Labour Cabinet, is fully alive to the importance of the subject of home air defence. The debate in the Lords, following a resolution moved by Lord Londonderry, a resolution couched in exactly the same terms as those used by Sir Samuel Hoare when he moved his resolution in the Commons, provided an opportunity for Lord Thomson to make his first official statement on Air Policy. Taken all round, the Air Minister's speech created a favourable impression. He is pledged to exploring all avenues that might conceivably lead to a reduction in armaments, naturally, but at the same time, as he put it, for the Labour Government the flower of idealism was rooted in common sense.

Making certain allowances for utterances possibly made "for other ears" than those of the Opposition, the Labour Government's real Air Policy appears to be reasonably satisfactory, inasmuch as it is continuing the sound and progressive policy formulated during Sir Samuel Hoare's term of office. That the new Government should reserve itself the right, while carrying out the expansion scheme commenced during the late Government, to confer with other nations and to attempt to reach a solution as to armaments by agreement, is easily understandable, nor need it give any cause for alarm. All sections would welcome a reduction all round in armaments. That they are progressing with the expansion schemes, even if but "by stages," shows that there is no intention to jeopardise unduly the safety of the country while that ideal state of total disarmament is being attained.

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

- Mar. 6 "Sound Detection," by Major Tucker, before R.Ae.S.
- Mar. 7 "Braided Rubber Shock Absorber Cord for Aircraft," by Mr. L. Rowland, before Inst. Ae.E.
- Mar. 12 "Safety Precautions in Aeroplanes," by Major J. H. Ledeboer, M.B.E., before C.U.Ae.S.
- Mar. 20 Annual Meeting of Inst.Ae.E.
- Mar. 20 "The Report of the Aeronautical Research Committee's Panel on Scale Effect," by Capt. W. S. Farren, before R.Ae.S.
- Mar. 24 British entries close for Schneider Cup and Gordon Bennett Balloon Races.
- April 1 Entries close for Schneider Cup and Gordon Bennett Balloon Races.
- April 3 "The British Aviation Mission to the Imperial Japanese Navy," by Colonel the Master of Sempill, before R.Ae.S.
- June 15 Gordon Bennett Balloon Race, Belgium
- June 21 F.A.I. Conference Opens, Paris.
- Aug. 10 Tour de France for Light 'Planes.

In connection with the Air Minister's statement of his policy, it is of considerable interest to examine the proposed figures of the estimates for the fighting services. Although these have not yet been issued, it is generally understood that they will include a reduction of approximately seven million in the Army Estimates, one of between two and three million in the Navy Estimates, and an increase of about two million in the Air Estimates. This is, at any rate, a gleam of encouragement, and appears to furnish further proof that "the flower of idealism has its roots in common sense." It may be objected that, under Sir Samuel Hoare's ministry, an increase of about four million in the Air Estimates had been contemplated, but it is understood that it has been possible to effect a saving of about two millions in other directions, and that consequently the two million increase contemplated will suffice to carry into effect the expansions, etc., planned by the late Government. That there should be an increase—however small—instead of a decrease in the Air Estimates is cause for satisfaction, although the amount devoted to air defence is still lamentably inadequate compared with the sums mentioned in connection with the other fighting services. Fourteen millions for the Air seems little enough compared with 45,000,000 for the Army and 55,500,000 for the Navy. Nevertheless, the very fact that, actual amounts apart, it is contemplated to accompany decreases in the Army and Navy Estimates with an increase in the Air Estimate indicates that the relative importance of the Air Service is increasingly being appreciated at last. We seem to be working steadily towards the time when the three services will be on an equal footing, as regards money spent on them, and that in itself is a good sign. That the time will come when the figures are reversed and the Air Estimates top the list we have not the slightest doubt. In the meantime things are moving in the right direction, even if progress is less rapid than many could wish.

The 1924 Light Aeroplane Competitions

After considerable delay, the first set of rules relating to the competitions for two-seater light 'planes, for which the Air Council has offered prizes amounting to £3,000, have been issued, and are published in this issue of FLIGHT. The main rules are simple enough in all conscience, consisting of a simple formula for obtaining the basis on which the marks will be awarded, and of take-off and pulling-up, tests in which marks will be awarded for distance saved. The formulation of the speed-range percentage figure, however, is none the less meritorious because of its simplicity, and, as shown under our Light 'Plane and Glider Notes, the formula will tend to have the effect of encouraging a very wide speed range, more especially in combination with a low landing speed. At the same time, the stipulation of a top speed of at least 60 m.p.h. and a slow speed of not more than 45 m.p.h. will effectively prevent "freak" machines from standing much chance in the competition, and the result should be that the machines evolved as a direct outcome of the Air Council's offer should be of very real practical value.

Concerning the rules published so far, little need be said. It might, perhaps, be argued that the number of marks which it is possible for machines to obtain in the alighting and starting tests is on the small side

as compared with the speed-range marks. The proportion will probably work out at something like 75 per cent. of the total number of marks for the speed-range tests, and 25 per cent. of the marks for the starting and landing. Whether these figures represent actually the relative value of speed range and good climb with quick pull-up is a debatable point, but it should be remembered that what the Air Council desires to develop is a two-seater suitable for instructional purposes. Thus such features as stability, controllability, etc., apart from climb and pull-up, may not be particularly wanted. It all depends upon whether it is desired to make the machines "fool-proof," or whether it is preferred to avoid making them too easy to fly, so that pupils progressing from the light 'plane to the more usual machine shall not find the change too great. We do not know if some such reason was behind the proportioning of marks, but the attitude is defensible. It must be realised that the school machine has different requirements from the private owner-pilot's mount, and that while the machine sold to the general public should be as near "fool-proof" as it is possible to make it, the same does not necessarily apply to the school machine.

Several supplementary regulations are still to be published before it is possible to form a complete picture of the nature of the competitions, although the present rules will enable designers to commence work on their machines. For instance, it is not quite clear whether the average of marks obtained in the various tests is to be used as a basis, or whether a competitor will be permitted to be judged on his best attempt. From the fact that in order to be eligible competitors must complete at least 10 hours' flying in the various tests, it would seem that the average is to be used.

In the alighting tests it is stated that this will consist of "a straight landing" over a barrier 6 ft. high. It would be interesting to know what is meant by a straight landing. Obviously, the expression is meant to convey that the pilot must not come in at a sharp angle and then, shortly after passing the barrier, turn the other way and so go zig-zagging along until he has lost flying speed. That is, of course, quite a sound stipulation. But does "straight landing" preclude a side-slip landing in which the machine is actually following a straight line at right angles to the barrier?

Again, it is stated that one mark will be awarded for every yard saved in the take-off and pull-up tests. It is not, however, stated whether negative marks will be given to competitors who exceed the limits laid down, i.e. who require a longer run for the take-off and who overshoot the distance from the barrier.

Doubtless these and many other points will be dealt with in the supplementary regulations that are to be issued later. The eliminating tests should present no difficulties to any competitor, and it might be objected that in drawing up the regulations too great lenience has been shown by allowing competitors two hours in which to dismantle and erect the machine.

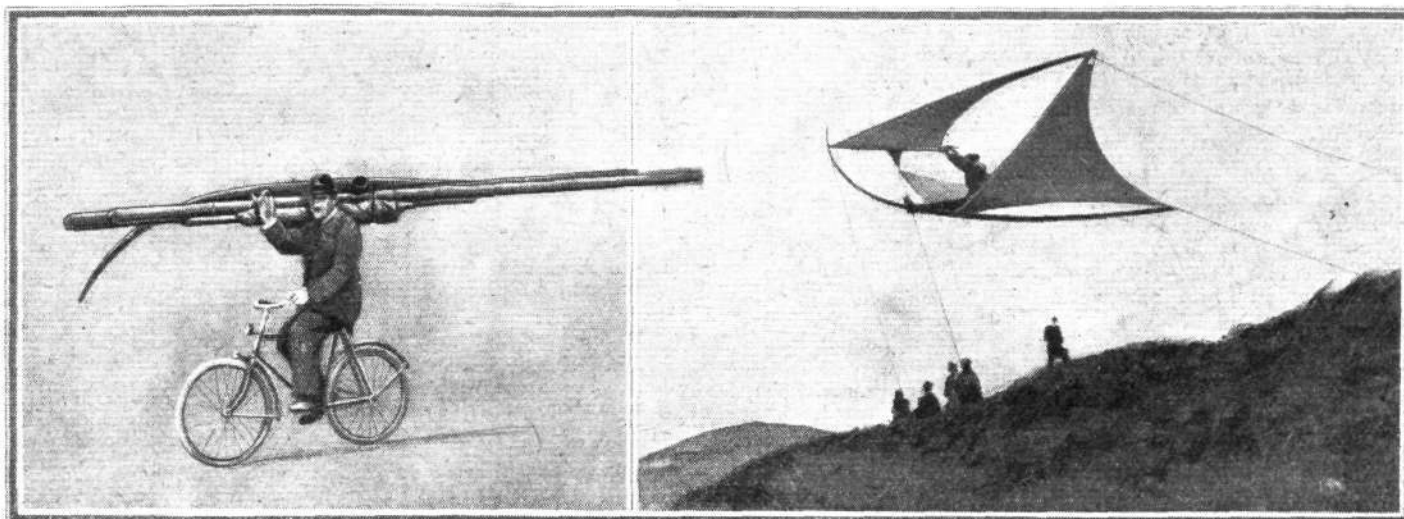
The announcement that His Grace the Duke of Sutherland, who is generously offering a prize of £500 for the best marks obtained in the take-off and pull-up competitions, intends to purchase a two-seater light 'plane for his own use will be received with general satisfaction, and cannot but do a great deal of good in encouraging others to follow his example and thus make a start with the privately-owned light 'plane of the future.

A NEW IDEA IN GLIDERS

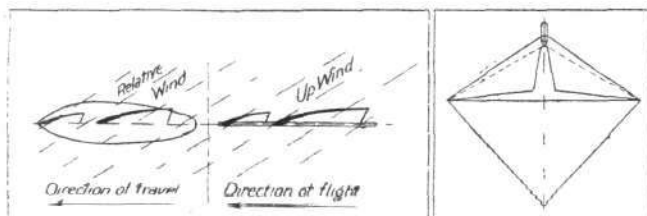
A German "Sailplane" of Unorthodox Design

ONE of the most extraordinary gliders ever built was designed and constructed in Germany towards the end of 1922, and flown in February of last year. It is not, however, until now that any information relating to this machine has been published. The January 26 issue of our German contemporary

Zeitschrift für Flugtechnik und Motorluftschiffahrt, otherwise "ZFM," contains an article by R. Platz, and some illustrations of the "Sailplane." In an editorial note it is stated that the article was sent to "ZFM" as long ago as February, 1923, but that, according to the wish of the author, it has not



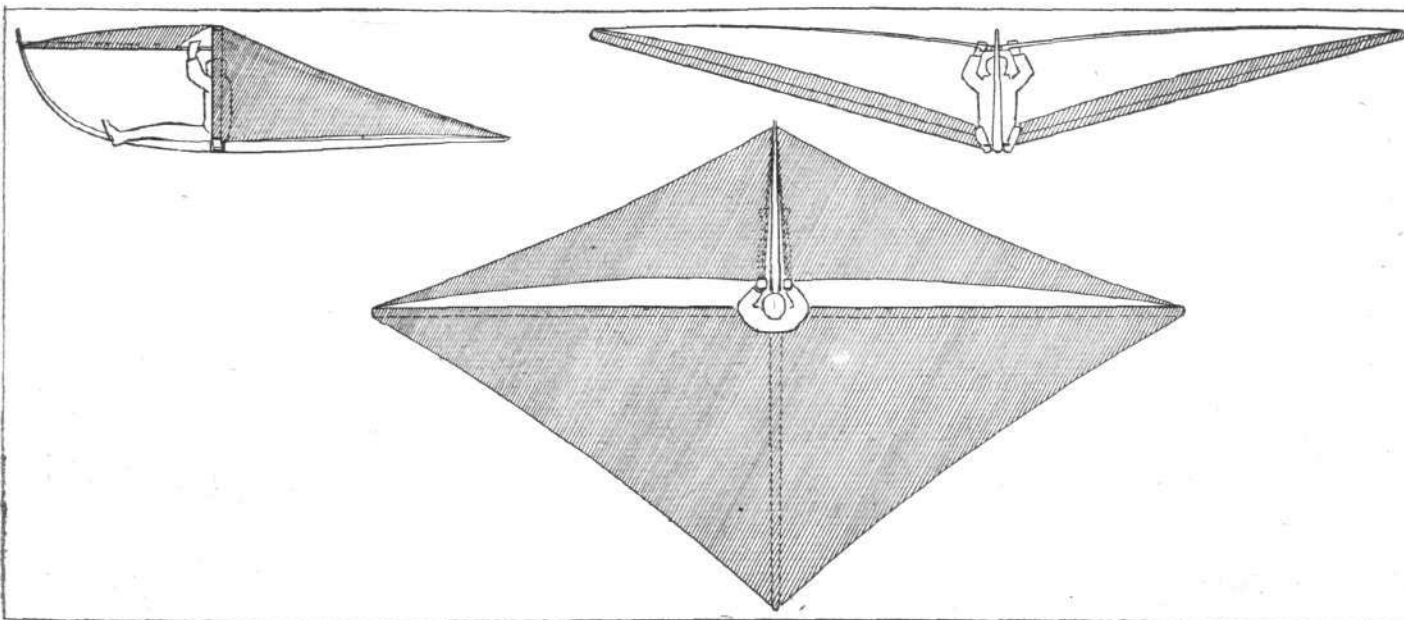
A GERMAN "SAILPLANE" : The photograph on the left shows a man transporting the folded machine on a bicycle. On the right the machine is seen being "kited" with a pilot on board.



A GERMAN "GLIDER" OF ORIGINAL DESIGN : On the left two diagrams representing plan view of a sloop-rigged boat, and side view of the glider in a wind with an upward trend. On the right plan of a paper model with which the first experiments were made.

been published until now. Some of the illustrations from "ZFM" are published herewith, and we have further prepared a set of diagrammatic side and front elevations and plan so as to show the general arrangement a little better than does the photograph.

The author of the article states that what gave him the idea for the "sailplane" was the memory of past experience with a sloop-rigged sailing boat, in which, by suitably trimming the sails, it was possible to steer without using the rudder, simply by hauling in or paying out the jib sheet. He conceived the idea that it should be possible to apply the same principle to a glider, and he furthermore set himself the conditions that the machine should cost no more than an ordinary bicycle, should be capable of being transported by one man, and should be so constructed as to enable it to be folded into a space sufficiently small to make it possible for



A GERMAN "SAILPLANE" : Plan, side and front elevations. These are of a purely diagrammatic character, and not necessarily to scale. They were drawn to assist in forming a clearer idea of the general arrangement of the machine.

the owner to take it with him on a passenger train. Our illustrations show the form which the solution of these problems has taken. First of all, a small paper model was made, as shown in one of our diagrams. The slotted forward area corresponds to the jib of a boat, and the triangular area at the back represents the mainsail. The model was weighted by a paper clip in the nose, and by bending down the corners of the "jib" the model could be made longitudinally stable. Turning down the starboard corner made the model turn to the right, and similarly an increase in the angle of the port corner resulted in a left-hand turn. Both corners turned down elevated the model, and turning them up made it dive. Thus directional and longitudinal controls were provided. For the sake of simplicity it was desired to avoid any lateral control, and the "wings" were therefore given a very large dihedral angle, which is stated to have done away with the necessity for lateral control. It is stated that the directional control was so effective that even when the model was dropped flat, *i.e.* without forward velocity, the rudders were effective.

After the first experiments had shown that the paper model would glide, a larger model of wood and silk was made, having a span of 1.3 m. (4 ft. 3 ins.) and a "sail area" of 0.4 sq. m. (4.3 sq. ft.). This model, which was first flown in November, 1922, "sailed" in a light wind, with a loading of $\frac{1}{4}$ lb./sq. ft., and repeatedly gained height. In order to ascertain how a larger machine was likely to behave, especially with deflection of spars and the variable "section" formed by the single-surface wing covering, a second model was built having an

area of 14 sq. ft. There was no appreciable difference in the performance. It was then decided to build a full-size machine, and in a few days this was accomplished.

The large machine has an area of 172 sq. ft., and consists of a central skid, of steel tubing in front and of circular section wood at the rear. Two large sockets welded to the sides of the skid receive the spar roots. The spars themselves are also of circular section wood, but it is not stated whether solid or hollow section. A change will be noted in the full-sized machine compared with the paper model. By bending the central skid upwards the "jibs" are raised a considerable height above the central portion of the "mainsail." Cables run from the spar tips to the front and rear ends of the skid. The wing surface is fabric, but there are no ribs of any sort.

The machine was first tried over the slope of some sand dunes, being weighted by ballast and held in position by four ropes, the wind being strong enough to keep it "kiting." Pilots of various weights were then "taken up," and were able, by operating the "jibs," to keep the machine trimmed and facing the wind. The first free flight was made in February, 1923, and is stated to have been quite successful. When folded the machine packs into a space measuring 11 ft. by 14 ins. by 10 ins., and weighs 40 kg. (88 lbs.).

It is not claimed that the machine is as efficient as the ordinary aeroplane-built monoplane gliders, but it is thought that its cheapness and simplicity will enable quite a good deal of fun being got out of it. Personally, we fail to see why the spars do not fold up, as they are very improperly braced.

□ □ □ □

LIGHT 'PLANE AND GLIDER NOTES

At last the main regulations governing the competition for light 'plane two-seaters which is being held this summer have been drawn up, and are published in this issue of *FLIGHT*. Although a considerable number of subsidiary regulations are still to be decided upon, it is possible to form a fairly clear opinion of the nature of the competition. It will be seen that in the main the feature that has been aimed at is speed range. Thus this year's competition will differ materially from that held at Lympne last October, when economy was the keynote, with everything else subordinated to the attainment of low fuel consumption. This year, as far as the rules indicate, there is to be no restriction on fuel consumption other than that formed incidentally by limiting the engine capacity to 1,100 c.c. Getting off and pulling up competitions are part of the programme, it is true, but a perusal of the rules indicates that as regards obtaining marks these are of relatively small importance, and that but a fairly small number of marks can be gained by machines capable of materially reducing the distances of take-off and pulling up.

* * *

THE formula to be used as a basis for the award of marks is simple enough as it stands, but certainly it must have taken a considerable amount of scheming to evolve it. As will be seen from the official rules, the basis is a percentage figure obtained by dividing into the speed-range (in miles per hour) the figure for landing speed (also expressed in m.p.h.). Thus a machine with a slow speed of 35 m.p.h. and a top speed of 75 m.p.h. has a speed range of 40 m.p.h., and the percentage figure would be $40 : 35 = 1.1425$, or 114.25 per cent. A minimum of 33.33 per cent. is stipulated, and this minimum is to be subtracted from the percentage figure obtained, so that in above case the figure used for awarding marks would be $114.25 - 33.33 = 80.92$ per cent.

* * *

FROM the fact that the basis used for the award of marks is speed range divided by slow speed, it appears that, although the formula obviously aims at a medium-speed machine, it favours the slow type rather than the fast one, since for a given speed-range the percentage figure increases with decrease in slow speed. A few numerical examples may serve to make this point quite clear.

* * *

THE medium-speed machine has already been examined in the example given above. The number of marks awarded in this case would, of course, be $80.92 \times 8 = 647.36$. Let us now take the case where the highest permissible landing speed of 45 m.p.h. is used. In order to obtain the same number of marks this machine would have to have a speed range of about 51.4 m.p.h., giving a top speed of 96.4 m.p.h. It is somewhat doubtful whether this speed could be attained with a machine having a power loading of round about 30 lbs./h.p.

At the other end of the scale we have the slow machine whose top speed is no more than the minimum stipulated, *i.e.* 60 m.p.h. Such a machine would have to have a speed range of about 32 m.p.h. and a landing speed of 28 m.p.h. to give the same percentage figure, and thus obtain the same number of marks. While this very low landing speed would necessarily entail very light wing loading and fairly high-lift wings, it does appear that the speed-range is more easily obtained at the lower end of the scale than at the upper. Another fact rather in favour of the slower type is that a certain number of marks are to be gained by the lightly loaded machine in the taking-off and pulling-up competitions, although with one mark per yard saved these figures are not likely to be of nearly as much importance as is the speed range figure. As usual in such cases, it seems probable that the machine with the best speed-range figure will not be at either extreme of the scale permitted, but will be somewhere midway. In other words, it does not appear to pay to load up the machine to the 45 m.p.h. slow speed, nor to keep it so lightly loaded as to get the minimum top speed of 60 m.p.h. A machine departing from both figures, but perhaps more from the faster type, seems to offer the best compromise. There is not much doubt that a very "clean" monoplane with a landing speed of round about the 35 m.p.h. should be capable of a top speed of 75 or 80 m.p.h., and should gain between 900 and 1,000 marks. On the other hand, it seems likely that a "clean" biplane, with lighter loading, would do almost if not quite as well nearer the lower end of the scale. Thus there is reason to believe that both types will be represented in the forthcoming trials. At any rate, the biplane is much more even with the monoplane than it was in last year's "economy" competition.

* * *

It would seem that the demand for speed-range and low-landing speeds should be particularly favourable to machines fitted with slotted wings, variable camber gear, etc., and it is therefore to be hoped that both Handley Page and Fairey will be represented at this year's competitions. No mention is made in the rules of such gear being prohibited, and it is stated that brakes will be permitted, provided they are carried throughout the competitions. Presumably, therefore, camber gear and slotted wings are also permitted, although in a training machine they might perhaps be regarded as unnecessary complications.

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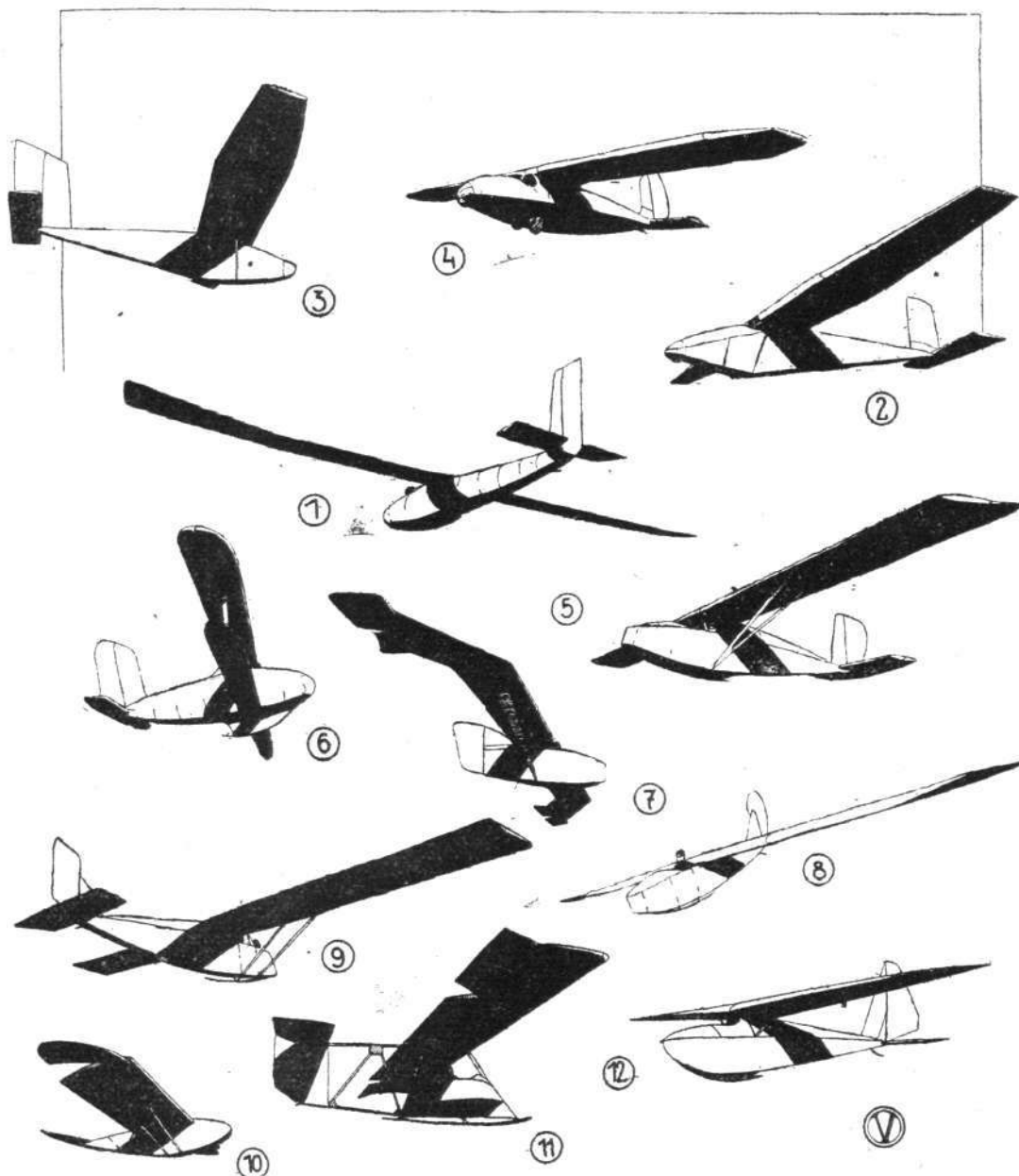
WITH reference to the sort of machines that may be expected to be produced, a rough estimate indicates that the total loaded weight will probably be from 750 lbs. to 950 lbs., with 800 lbs. as the average figure. As wing loadings, to give the sort of landing speeds required, will probably average about 4 lbs./sq. ft., the machines may be expected to be of approximately 200 sq. ft. of surface, perhaps a little less in the case of

the monoplanes and a little more for the biplanes, the former presumably trying for the higher top speeds, with slow speeds between 30 and 40 m.p.h., and the latter for top speeds of 65 or 70 m.p.h. and slow speeds of 30 m.p.h. or under.

It would almost appear that one of the best compromises might be formed by a "one-and-a-half" plane, not the modern "sesquiplan" type as much as the War type Nieuports, in which there was a large top plane and a bottom plane of very narrow chord, a single pair of V-struts joining the top and bottom plane on each side, and very simple wire bracing being used. The efficiency of such a structure should be not

for the top-speed condition, and fairly good efficiency should be obtained, so that it seems likely that maximum speeds of over 80 m.p.h. will be obtained by some of the competing machines. Assuming a maximum horse-power of 30, a propeller efficiency of 78 per cent., and a total loaded weight of the machine of 800 lbs., the L/D ratio (at maximum speed, of course) necessary to enable a speed of 85 m.p.h. to be attained is 7.75, a figure which should be within the capacity of a machine whose maximum L/D is perhaps 15 or 16.

THE taking off and alighting competitions do not appear to call for much comment. From the small number of marks



SOME 1923 RHÖN GLIDERS: These "silhouettes," reproduced by courtesy of *Letectvi*, of Prague, show some of the more interesting machines taking part in last year's competitions. 1. The Darmstadt "Konsul" is the machine on which the longest glide was made. 2. Herr Martens' "Strolch" was one of the best designed and constructed machines of the meeting. 3. The "Messerschmidt 1923." 4. "Espanlaub V." 5. "Margarete." 6. The Heidelberger "Kurpfalz." 7. The Berlin "Charlotte." 8. The "Erfurt." 9. The Baden-Baden "Nimm mich mit" (Take me with you). 10. "Speta." 11. "Hols der Teufel." 12. "Der Dessauer."

very greatly inferior to that of a monoplane with a couple of bracing tubes, and there is little doubt that the wing structure would be lighter. The pure cantilever monoplane, although more efficient, would have to have fairly large wings to give a sufficiently low landing speed, and its wing structure would probably be somewhat heavy. The ordinary thin-wing, equal-span, wire-braced biplane would probably not have a sufficiently good L/D ratio to give a great enough top speed. Between the two there is room for all sorts of compromises, and some very interesting machines should be produced for the competitions in September. Further particulars are still required, but the main points of the rules enable designers to get on with their planning.

As the largest possible top speed will be aimed at, without regard to fuel economy, propellers will probably be designed

which machines are likely to collect out of this competition, it seems that those responsible for drawing up the rules have not considered the subject one of nearly such great importance as speed range. In the take-off competition a machine may succeed in collecting 150 to 200 marks, and in alighting perhaps another 50 marks or so, giving a total, in this section, of 250 marks or so, which is not much more than 25 per cent. of the marks that may be gained in the speed-range competition. Much will depend upon the weather during these tests, as a good strong head wind would enable these lightly loaded machines to descend very nearly vertically, and to get off in a very short run. Presumably, however, it is intended to carry out these tests on calm days. Luck would seem to have a good deal to do with the awards obtained in this section, since the wind may change considerably between the attempt of one competitor and that of another.

TWO-SEATER LIGHT AEROPLANE COMPETITIONS, 1924

THE conditions under which the competitions for the Air Council's prizes of £3,000, offered with a view to encouraging the production of a two-seater light aeroplane suitable for instructional purposes, will be held are now announced. Held under the competition rules of the Royal Aero Club, the conditions are as follows:—

Supplementary Regulations, No. 1.

Date.—It is proposed to hold the competition in September, 1924. The exact date and locality will be announced later.

Organisation.—The competition will be conducted by the Royal Aero Club, under the Competition Rules of the Royal Aero Club.

Light Aeroplane.—The competition is open to any aeroplane, the total piston displacement of the engine or engines of which does not exceed 1,100 c.c.

Two-seater, Dual Control.—The aeroplane must be a two-seater fitted with dual control, and the air speed indicator must be visible from both seats.

British Manufacture.—The aeroplane, including the engine and magneto, must have been entirely designed and constructed in the British Empire.

Fuel.—The fuel used must be commercially obtainable in bulk.

Competitors.—The entrant and pilot must be British subjects.

Passenger.—The carrying of a passenger is optional, except in the Eliminating Test "B," Demonstration of Dual Control.

Load to be carried.—The load to be carried, exclusive of fuel, must be made up to 340 lbs. This includes the weight of the pilot and passenger (if carried). If there is no passenger, 170 lbs. must be carried in each seat; but if the pilot exceeds 170 lbs., the balance of the total weight required must be carried in the spare seat.

Air Navigation Regulations.—Competitors must comply with the Air Navigation Regulations in force, subject to any concessions which may be made by the Air Ministry for this competition.

Aeroplane.—The Air Ministry require a certificate of airworthiness of normal category for the aeroplane, but will not require to be supplied with drawings.

Engine.—The Air Ministry will not require a certificate of airworthiness for the engine.

Entries.—The entry fee is £20. This fee, together with the entry form, must be received by the Royal Aero Club not later than August 1, 1924. Late entries will be received up to 12 noon on August 15, 1924. Late entry fee, £40. The Royal Aero Club reserves to itself the right to refuse any entry and to prohibit the flight in the competition of any competitor if it considers the flight would be dangerous.

Eliminating Tests.

The eliminating tests will be as follows:—

(A) **Dismantling, Housing and Re-erecting.**—For this test, the aeroplane must be presented to the officials fully erected.

It must then be dismantled or folded in such a manner as to permit of its being transported as a whole over a distance of not more than 25 yards, and placed in a shed 10 ft. in width. It must then be taken outside the shed and re-erected.

Two persons only will be allowed to handle the aeroplane throughout this test, and the time occupied must not exceed two hours.

(B) **Demonstration of Dual Control.**—This test will consist of two separate flights, each of one complete lap of the course, at the termination of each of which one figure of eight must be flown within the boundary of the aerodrome.

The pilot and passenger will occupy alternately the two seats in the aeroplane.

Eliminating tests "A" and "B" must be carried out in this order, and must be passed to the satisfaction of the officials before any flights are made in the competition proper.

The Curtiss Engine in England.

THE Curtiss D.12 engines installed in the Curtiss-Navy racers in the Schneider seaplane race at Cowes last year came in for very favourable comment by everyone who had an opportunity of inspecting them. Combined with light specific weight, low fuel consumption, great reliability, and other desirable features, the Curtiss D.12 is of a size for which there should be a good demand, and the type has one very great advantage in that its frontal area is very small, thus enabling it to be nicely streamlined into a fuselage of small cross sectional area. We learn that one of the results of his recent visit to the United States is that Mr. C. R. Fairey has acquired for the Fairey Aviation Co., Ltd., Hayes, Middlesex, all the

Competition.

In order to be eligible for any of the prizes offered, competitors must complete at least 10 hours' flying in the various tests, during the period of the competitions.

Prizes.

1st prize, £2,000, presented by the Air Council.

2nd prize, £1,000, presented by the Air Council.

The prize of £2,000 will be awarded to the entrant of the aeroplane which shall have obtained the greatest aggregate of marks in the Schedule of Tests.

The prize of £1,000 will be awarded to the entrant of the aeroplane which is placed second.

Schedule of Tests.—(1) range of speed (a) high speed, (b) low speed. (2) Getting off. (3) Pulling up.

High Speed.—This test will be carried out over a course, in two separate flights of approximately 75 miles each. An interval will be allowed between the two flights for taking in fuel and oil only.

Low Speed.—The aeroplane will be timed up and down a straight course of not less than 500 yds. The average speed of four consecutive flights, two up and two down, will be taken.

Range of Speed.—No marks will be awarded unless the aeroplane satisfies both the following conditions:—

High speed, at least 60 m.p.h.

Low speed, not more than 45 m.p.h.

Marks will be awarded for range of speed expressed as a percentage of the low speed—e.g., high speed is 60 m.p.h., low speed is 40 m.p.h., range of speed is 20 m.p.h. Percentage, range of speed/low speed = 50 per cent.

The basis of marking to be: No marks for a percentage of 33½ per cent. or less. Eight marks for every 1 per cent. over 33½ per cent., and parts of 1 per cent. *pro rata*.

Getting Off.—This test will consist of a take off, starting from rest and flying in a straight line over a barrier 25 ft. high. The pilot will select his own distance from the barrier.

Marks will be awarded according to the distance from the starting point to the barrier, on the following basis:—

One mark for every yard by which the distance is less than 450 yds.

Pulling Up.—This test will consist of a straight landing over a barrier 6 ft. high.

Marks will be awarded according to the length of run before the aeroplane comes to rest, on the following basis:—

One mark for every yard by which the distance from the centre of the barrier is less than 150 yds.

The engine may be shut off before crossing the barrier.

Any form of braking device may be used provided it is carried throughout the competition.

Any damage to the aeroplane will invalidate the attempt.

Further supplementary regulations containing full details of the competition, including the number of attempts which will be allowed in the various tests, will be issued later.

The usual general stipulations concerning responsibility, third-party risk, etc., are made.

GETTING-OFF AND PULLING-UP COMPETITION.

1st prize £500, presented by the Duke of Sutherland.

The prize of £500, presented by the Duke of Sutherland, will be awarded to the entrant of the aeroplane which shall have obtained the greatest aggregate of marks in these two tests.

2nd prize £100, presented by Capt. C. B. Wilson, M.C.

The prize of £100, presented by Capt. C. B. Wilson, M.C., will be awarded to the entrant of the aeroplane occupying second place in these tests.

The Duke of Sutherland has expressed to the Royal Aero Club his intention of purchasing a two-seater light aeroplane for his own use, of a type evolved from the aeroplanes taking part in the competition. This will not necessarily be of the same design as the winning aeroplane.

British rights of the Curtiss engines generally, and of the D.12 particularly. The engines will shortly be built in this country under licence, but it has not yet been definitely decided whether at the Hayes factory or at an entirely separate engine factory elsewhere.

Wing-Commander Greig's New Post.

It is announced in the *London Gazette* that the King has appointed Wing-Commander Louis Greig, C.V.O., to be a Gentleman Usher in Ordinary to His Majesty, and that the Duke of York has appointed Captain Basil Vernon Brooke, C.V.O., R.N. (retired), to be Comptroller and Equerry to his Royal Highness, in place of Wing-Commander Greig.

NOTICES TO AIRMEN

International Aeronautical Maps : Egypt and Oman

THE first general sheets of the International Aeronautical Maps, prepared in accordance with Annex F of the International Air Convention, are now on sale. The maps are drawn on Mercator's Projection to a scale of 1° of longitude equals 3 centimetres.

The two sheets published are *Egypt* (provisional), G.S.G.S. (Air) No. 115, and *Oman* (provisional) G.S.G.S. (Air) No. 129. The areas covered are :

Egypt—Latitude 23° N. to 37° N.; longitude 16° E. to 38° E.

Oman—Latitude 11° N. to 25° N.; longitude 52° E. to 74° E.

These maps may be obtained through the usual agents, price 4s. (paper) and 4s. 6d. (linen-backed).

(No. 10 of 1924.)



Two Fatal Flying Accidents

Two flying accidents, involving the deaths of four members of the R.A.F., occurred on Monday last. At Duxford Aerodrome an "Avro," piloted by Sergt. G. T. Bond, with Pilot Officer W. A. Tattersall as pupil, and a Sopwith "Snipe," piloted by Flt. Lieut. V. A. Albrecht, with Flying Officer J. G. Peck as pupil, collided when landing. Flying Officer Peck and Sergt. Bond were killed instantly, but the others were injured, and were taken to Addenbrook's Hospital, Cambridge. The second accident occurred at Biggin Hill, when a Vickers "Vimy" crashed on landing, resulting in the deaths of Flying Officer S. W. Smith and Sergt. F. Lister, whilst Sergt. H. S. H. Meech, who was also in the machine, escaped uninjured.

The U.S. Polar Flight Abandoned

PRESIDENT COOLIDGE has ordered the preparations for the United States Navy's proposed airship flight to the North Pole this summer to be suspended on the grounds of economy.

A Turkish Air Mail Service

AN air mail service between Constantinople and Angora was inaugurated on February 14, the first journey taking three hours and seven minutes. The operating company and the machines are German, working under arrangement with a Turkish concessionaire.

The "Dixmude" Inquiry

THE report of the Superior Commission of Inquiry into the loss of the French airship "Dixmude" confirms the previous conclusion, that the airship was destroyed by fire caused by lightning. It dismisses the theory of individual responsibility, and recommends that the question of collective responsibility should not be pursued. The report also states that the date of the departure of the airship was the most



Holland : Hellevoetsluis Landing Ground Abandoned

It is notified :—

1. Hellevoetsluis landing ground has been abandoned, and is no longer available for landing.

(No. 12 of 1924.)

France : Danger Area at Dijon Aerodrome

1. *Dijon* (Lat. 47° 17' N., Long. 5° 05' E.).

An area of about 300 × 300 yards in the eastern corner of Dijon aerodrome has been reserved for use by the military authorities for instruction purposes in connection with explosives.

Pilots are therefore warned that they should avoid this danger area, the boundaries of which are clearly marked.

(No. 13 of 1924.)

favourable of the whole year for crossing the Sahara, and the most favourable of the whole winter for passing over the Mediterranean. The material condition of the "Dixmude" and her airworthiness were beyond criticism, but the arrangements for her temporary landing and the renewal of her petrol supplies in Northern Africa were inadequate.

French Aero Show in 1924

It has now been definitely decided to hold an aero exhibition in Paris during 1924. The exact dates have not yet been settled, but the Grand Palais will probably hold the avions during the last part of November and first part of December.

Aircraft at Wembley Exhibition

THE Air Ministry section in the Government Pavilion at the British Empire Exhibition, Wembley, will, we understand, be of a very comprehensive character. It will convey to the visitor in a striking and novel manner an idea of the potentialities of aviation, both from the military and civil points of view. Here are some of the features of the exhibit. A realistic demonstration will be presented of the work accomplished by British aircraft in Palestine, of aeroplanes operating with tanks and infantry in France, and of aircraft operating with the navy. There will be shown in the theatre a scenic spectacle depicting a hostile air attack upon London, which will serve to show the true meaning of aerial attack and aerial defence. A large number of elaborate and ingenious models will illustrate various other phases of aviation. For instance, there will be large-scale models of Croydon aerodrome—complete in every detail—and of the South of England and North of France, showing the London-Continental air routes. There will also be another model of the Cairo-Baghdad air mail route. It is probable that special flying events will be arranged in connection with the Exhibition.



A NEW SOPWITH-HAWKER MACHINE : The "Duiker" is a two-seater corps reconnaissance monoplane, fitted with Bristol "Jupiter" or Siddeley "Jaguar" engine. The machine shown in the photograph has the former engine. As the "Duiker" is built for the Air Ministry, no detail information concerning it may be published. Note the tapering wing, which is thinned down in the centre so as to give a good view.

The machine was designed and built by the H. G. Hawker Engineering Co., Ltd., of Kingston-on-Thames.

SOME FEATURES IN THE PRESENT POSITION OF AERIAL PHOTOGRAPHIC SURVEY

By H. HAMSHAW THOMAS

(Concluded from page 122.)

"AERIAL survey by vertical photographs approaches the ideal survey at least in one point—it does or can provide the greatest amount of detail about the surface of the ground. The amount of detail is far more than it is ever humanly possible to obtain by a ground survey where any large area has to be covered. It may be possible to see on the photographs, taken from a height of 10,000 ft. objects on the ground as small as 2 ft. across, if they project slightly and cast a shadow. This knowledge of surface detail may in places be of little importance, but in other places may have very great value. Its value may be estimated from two points of view—firstly as increasing our scientific knowledge of the earth, and, secondly, as having an economic importance in connection with the development of communications, of irrigation and water supply, of agriculture, of forestry and of mining operations. As man pushes out further and further into uninhabited country, he needs surveys of the country, and if he can get a primary survey of topographic position, together with all the detailed information necessary for development, much labour will be saved. The British Empire at the present time contains many regions which are waiting for an aerial survey. To quote from the Report of Canadian Survey:—

"The settled part of Canada, of which more or less imperfect maps are available, is confined to a fringe or belt along the southern boundary. The northern part, of immense extent, is very little known. Roads do not exist, the only means of communication being by dog-train in winter and by the lakes and rivers in summer. Traverses along the waterways furnish the basis for such maps as we have. In the best of these traverses, the angles are measured with a theodolite and the distances by stadia or with a range finder. The surveyor completes his plan by sketching such details as he can see from the level of the water; what is beyond the shores or the islands is necessarily omitted."

"Such a survey is no doubt useful as a preliminary reconnaissance, but if any development is to be done the country will probably have to be again surveyed for the purpose. Such work may be long and difficult, and its difficulty may hinder the progress of development for many years. Everyone who has had any experience of finding a way through forest regions without tracks knows how difficult it may be, and yet at the same time there may be natural roads through at least part of the forest zone if they could only be located. An aerial survey in a densely-wooded area presents no more difficulty than a survey over an open area. It may be carried on at the rate mentioned above, provided that landing grounds can be found in the vicinity, and in many places landing can be effected for seaplanes on lakes or rivers. Such a survey shows at once where are the natural roads through the forest or at least which are the shortest routes through. It is thus a most important preliminary to the construction of roads or railways.

"Similarly, in hilly districts aerial survey, by reason of the complete and rich record of topographic detail, will often show the engineer the best routes along which communications may be built. I came across an example of this in North Central Palestine. The plains of Central Syria are divided from Palestine proper by a stretch of very hilly country stretching between Hermon and the sea. At no place are the hills very high, but there no road has ever been made through this country to link up the more prosperous communities to the north and south; communications involve a very considerable detour to the east or to the west. And yet through this region there exists a natural route difficult to locate on the surface of the ground, but obviously the best means of traversing the hills. This is a dry river valley which once led the drainage of Central Syria into the Jordan Valley. It is not shown on the map prepared by Conder and Kitchener, but was evidently discovered during the War when the making of a road along it was commenced. It was well seen on aerial photographs.

"Aerial survey shows every detail in the drainage system of an area, and may thus be of great use in connection with water supply, the sighting of reservoirs and irrigation. In Canada in 1922 much work was done for this purpose."

"Aerial survey has contributions to make to the science of botany with its more practical sides of agriculture and

forestry; to geology with its obvious application to mining and other problems; to archaeology with its general appeal to the human mind; and, of course, to the all-embracing science of geography. Let me endeavour to point out a few of the points in this connection which have come to my notice.

"Botany.—A most important feature of the earth's surface is provided by the vegetation which covers it. The study of this vegetation and its distribution, the causes which underlie the occurrence of certain types of plant commodities in one spot and the growth of similar or dissimilar vegetation in another locality, form the subject of much investigation by botanists today. It may be that some of the plants in the native vegetation have an ultimate economic value, and it may be that the ground occupied by certain types of native vegetation may be readily cultivated or utilised by man, or it may be that the vegetation is a factor which is influencing the shape and extent of topographical features such as coast lines. But in other cases the study of plant distribution may have no immediate practical application, and serves only to add to our knowledge of the workings of nature.

"It can be readily understood that aerial survey forms a ready means of mapping the extent and distribution of forest, but it may come as a surprise to some to know that in many cases it also enables us to accurately ascertain the numbers of certain trees in any area, the size of those trees, or at least the relative size; further, that after a little practice we may recognise certain kinds of trees when we see them on the photographs. Again, aerial survey records the exact extent of areas in the forests which have been burned or cut down, and of others in which young timber is again growing up.

"A forest tree is a big thing, and it is not surprising that in photos. of coniferous forests we can often distinguish each individual full-grown tree, but even when the vegetation of the ground is composed of tiny plants, the all-seeing eye of the camera may be able to record their presence.

"I have already referred to the survey of Blakeney Harbour in Norfolk, and I may here mention some points of interest which were derived from the study of the photographs taken at this spot.

"The ground surveyed was to a considerable extent covered with the natural vegetation of maritime areas. It included sand dunes with their tufted grasses; much of the area was salt marsh with a variety of plants, varying from tangled masses of the sea-weed *Pelvetia*; tracts covered with the sea lavender; sward more or less carpeted with grasses, to a good deal of bare mud without any plants. The great shingle spit bears the important bushy *Suaeda fruticosa*, which helps to stabilise it, with other occasional plants. We found that our aerial survey provided quite a good map of all this vegetation at the same time as it gave the complicated topographical detail. After a short time on the ground with the photographs one could soon recognise how each type of vegetation was depicted, and the relation of several of the vegetation types to the topography was at once shown.

"For example, we can see how the incipient dunes are being colonised by the marram grass, any tuft over 2 ft. across being visible on the prints; the grass on the younger dunes is still in isolated tufts, but on the older dunes marram and other grasses have grown together, forming a more or less continuous covering and anchoring the blowing sand. The shingle-binding *Suaeda* is clearly seen as a line of darker dots, and tracing it along the bank we come to an area in which it has died out. Such an area will be most liable to the attack of the waves in a storm, and, in fact, after the first survey was made a very high tide and rough weather broke through the beach at this point, destroyed the concrete sea wall and flooded the pastures behind it. We see the early stages in the colonisation of bare mud by vegetation, a process which will probably end in the replacement of mud flats by a luxurious sward."

"The topographical side of this work merits more attention than I am here able to devote to it. Blakeney Point is one of those areas where the coast line is undergoing rapid changes, so rapid, in fact, that the charts made by ordinary methods soon become out of date. The changes which took place between 1913 and 1921, especially the building of a new spit nearly a mile in length, are shown in two

maps—one from a ground survey, the other from an air survey. The new Point was photographed three times in 1921—in May, October and December—and each time appreciable changes were noticed especially in the reflexed part of the hook of the new Point, which moved nearly 100 yards between October and December. The importance of a rapid means of survey of the kind which can be carried out in a few hours is obvious, for though the sea-going traffic from the village of Blakeney is not large, there may be many other parts of the world in which similar changes are going on which are vital to navigation and sea-borne commerce.

"In this connection I may point out that the approach to one of our greatest ports is at present in need of a survey which can only be done from the air without very great labour.

"Southampton Water and the neighbouring shores are being invaded by a salt marsh grass *Spartina Townsendi*, which was unknown till 1870. Appearing at first in a few clumps, it has spread with astonishing rapidity, and now covers great areas which were formerly mud flats exposed at low water. It has spread into Poole Harbour, where it covers large areas, and eastward as far as Rye, while across the Channel it is establishing itself in France. While I do not anticipate that this rapid growth of vegetation will influence greatly the main Channel to Southampton in the near future, it may ultimately do so, and it considerably alters the appearance of the banks. An annual aerial survey which could be put into the hands of those who are studying such tidal lands would be of great scientific interest and perhaps of ultimate commercial importance, since nobody really knows what will be the results of this remarkable growth of the *Spartina* grass.

"*Geology*.—The scientific study of the structure of the earth's crust will be greatly assisted by the execution of aerial photographic surveys. The geologist has two sides to his work—one the study of the surface features and the recognition of the causes which have brought about the present topography, and secondly the study of the underlying rocks and their contents. This scientific study has a practical outcome in the investigation of water supply and of the distribution of deposits of coal, oil, ores and other mineral substances.

"The value of the air picture in the study of surface features is obvious. Not only does it display the main features of the ground, but also the smaller details such as would seldom be shown even on a good topographical map. The investigation of these features on the ground would require a very laborious and long-continued survey, which in many parts of the world would be almost out of the question on account of the difficulty of maintaining an expedition in the field for a sufficiently long period.

"In this connection I may mention that the aerial survey of Palestine has provided data for the scientific exploration of many of the complicated and difficult points in the surface features of this country. As an example, we may notice the geology of the Jordan Valley. It would appear that the present Dead Sea is the last remnant of a very much larger sheet of water which once spread upwards and was connected with the Sea of Galilee. The floor of the Valley is now filled with flat beds of calcareous mud laid down on the bed of this great inland sea. What has been the cause of this great diminution of the area of the water?

"The aerial survey shows that the drainage system of the large part of Central Syria with its high mountains once flowed into the Jordan Valley, but the channel along which this drainage passed in bygone times is now empty. The water which once poured down through it in a great stream has been captured by a smaller river, and is now led directly to the coast, and so the water supply of the Jordan has been very greatly diminished and is restricted to streams arising in its own vicinity.

"We may pass from this example to consider how aerial survey may help the progress of knowledge as to the structure of the earth, and we must first note that this knowledge depends very largely on geological mapping. A geological map shows the distribution of the outcrops of the various types of rock on the surface, and thus, with a knowledge of the dip and the nature of the rock, goes a long way in the elucidation of structure and the explanation of what happens underground. Obviously we cannot at once turn an air survey map into a geological map, but the air survey will very much lighten the work of the geologist and enable him to cover large areas of ground in a more detailed manner. In the first place, the photographs will show exactly where outcrops of the underlying rock are to be found, and the geologist can proceed to them without having to spend much time in searching through a large area mostly covered with

soil and vegetation. Then in the same way as mentioned in the case of vegetation surveys, the geologist will often be able to get a map of extent of country occupied by outcrops of a particular kind of rock after a short exploration and comparison of the photographs with the actual rock features in any district. In more exceptional cases, such as in many parts of Palestine, the individual beds of rock in a formation may be recognised in the photographs and render their mapping a much easier matter. In all cases an air survey will greatly facilitate the first investigation of the geology of a country, which is a preliminary to the location of deposits of mineral wealth. This has been recognised by the Canadian Department of Mines and by the United States Department of Mines.

"In the investigation of water supply problems, progress will be facilitated not only by the accurate portrayal of the courses of streams and rivers by aerial survey, but also owing to the fact that the position of springs is very readily located by the camera.

"*Archæology*.—I have above touched on the application of aerial survey in two branches of science which have in many respects important practical application, and I should finally mention one further study which has already derived some benefit from air work, and will in the future derive more, but which has less bearing on the economic development of a country. The study of archæology has, however, a great fascination for the average civilised man, and it has long been the practice to show in our English ordnance maps features of archæological interest.

"There is no need to refer to the interesting discoveries at Stonehenge resulting from aerial survey, but I should like to mention how in many places at home and abroad an air survey will bring to light features of historical and archæological importance in a striking way. In the case of the remains of ancient buildings, the air photograph gives their ground plan, without a prolonged series of measurements being taken on the ground. In other cases remains of historic or prehistoric buildings are buried under an accumulation of soil and *débris*, and may escape the notice of the traveller on the ground. In such cases the aerial survey photograph may reveal the presence of these buried structures, for when viewed from above we can quickly recognise any symmetry that may occur in mounds of earth which often cover old sites which, when examined on the ground, appear without order and show little trace of man's handiwork.

"One of the most striking examples of this was seen in the vertical photographs of the ancient ninth century city at Samarra in Mesopotamia. Here the ground plan of large areas could be clearly seen with the sites of the streets, buildings and houses perfectly outlined. It is hard to believe that these are not distinctly seen on the ground, but yet it is said by those who have been there that the site appears to show in most places nothing but a vast series of shapeless and irregular mounds of earth. This example is provided by the ruins of a comparatively recent city, but it serves to illustrate the general principle. In many parts of the world aerial survey should, if carried out, be of very great help in the study of ancient monuments, cities and civilisations.

"One further example may be given. At the present day all the southern part of the Jordan Valley north of the Dead Sea is a very arid and desolate region, with very little cultivation and very few inhabitants. Yet according to the Biblical story it was once a very fertile district, and one wonders what could have given rise to this idea. It was interesting to find as the result of air survey that in some parts of the eastern side of the valley there are remains of an extensive system of irrigation channels arranged in regular lines, which watered the ground with water from the hills of Moab. These channels are shown owing to the fact that they are filled with scrub-like plants which are less regularly arranged and less abundant in the surrounding country and in the flats between the channels. We cannot tell, of course, what is the age of these irrigation systems, but they are probably of considerable antiquity.

"There is always a possibility that areas like these which have been cultivated in ancient times might be again opened up and brought under cultivation, and so discoveries of antiquarian interest might become of modern economic importance.

Conclusion

"We have seen in the first part of the lecture how progress has been made in the working out of methods of aerial survey on a basis of vertical photographs, and how it has become possible to carry out reconnaissance surveys over great tracts of country with extraordinary rapidity and probably in the end with considerable economy. While in some cases the filling in of the topographical details will be best done

with the help of oblique photographs, in other areas a complete mosaic of vertical photographs may be advantageous. Such photographs will supply a very accurate and detailed source of topographical knowledge.

"In the second part of this communication we have seen how at the same time as the topographical information is gained in many places a great deal of other information can be derived from the photographs, which has at the same time both a scientific and an economic value. Scientific knowledge that adds to man's information about the processes of nature is valuable for that alone, but as we all know, in the course of time pure science contributes to man's welfare and his comfort, even though that knowledge appears to have no immediate practical application. But the knowledge gained from aerial surveys is already having important economic applications. It helps in the work of reclaiming land for agriculture and in showing what areas are the most suitable for the culture of certain crops. It helps in the work of developing water supply and in the utilisation of streams and rivers either for irrigation or for the generation of power. It forms the only known practical method of ascertaining the distribution of forest trees over a large area, of mapping densely-forested regions, of showing the area felled or burned, and of studying the regeneration of such areas. It greatly assists in the work of geological surveying, and so facilitates the discovery and development of deposits of coal and valuable minerals.

"In all the above-mentioned directions the great utility of aerial survey has already been proved, especially by work in Canada. Aeroplane photographic surveys would be very valuable if they only provided the information on the subjects mentioned in the last paragraph, but when this provision is added to the value of the topographic maps, we are forced to the conclusion that for an undeveloped country rich in natural resources, aerial photography is the pre-eminent method of survey, and considering all the purposes to which it can be put, and the rapidity with which great areas can be traversed, it must in the long run be the most economical method.

"We must not forget that even if at first a topographical map is the chief requisite, and it is not desired to exploit water systems or to estimate forest reserves in detail, the photographs when taken may be kept for years, and at a much later period may be used for such purposes or assist in the work of a geological or vegetational survey. Unless man is actively engaged in changing the surface of the country, the processes of nature are very slow, and often the passage of half a century or more would not diminish the value of the photographs. So in uninhabited regions a photographic survey might be regarded as something permanent, which could be referred to from time to time as need arose. Its first use might be merely for maps on a small scale, but later in some localities it could be made the basis of a new series of maps on a much larger scale, of forest maps, or of geological maps. At a still later period it may be useful to provide information for the construction of roads or railways, and for the formation of towns or villages. Again, the time might come when water-power was needed, and the old photographs might again be studied from this point of

view. At the present time it is infrequent that the first survey can be utilised for any or all of these objects, and as each stage arrives in the development of a country a new survey has to be made.

But if we agree upon the value of the aerial method of survey, we may still have some doubts as to its practicability. The Survey of India initiated experiments on lines which I suggested in 1919, and the results* seemed to indicate that the method was liable to partial, if not complete, failure. I judge it probable, perhaps certain, that other failures will occur before the factors necessary for success are realised.

"Success will only be achieved if all who are concerned thoroughly appreciate the part which they have to play in the work, the difficulties which may arise, the errors which have to be guarded against. The commonest mistake that is now current is that any skilful pilot can be sent up with a machine to take survey photographs over an area, without previous training or full knowledge of what he has to do and what not to do. But all turns on the abilities of the pilot, and he must have gone through some course of training before he actually starts on a survey. Even if he knows what he has to do, he may, without previous training, find that when he gets into the air he is unable to do what he wishes; while looking for his starting point he loses height, while trying to get on his compass course he gets one wing down, and so on. The remedy for this is not to abandon any system which tests the skill of the pilot, but to train him and his observer thoroughly for the job.

"The whole of the procedure must be carefully analysed, and it must be arranged exactly so that it becomes a matter of routine. In England, under favourable weather conditions, it would probably be impossible to train a pilot in less than a month to reach the standard of skill necessary for the commencement of survey work. The observer might probably learn his work in a shorter time. The performances of the pilot must be checked carefully at each stage, and he must be proficient in one stage before passing to the next. Every surveyor needs a more or less long course of training, and the aerial surveyor is no exception to the rule.

"But my own experience shows that pilots can be trained to do all that is required of them, and indicates that with more practice a good man will even exceed the area indicated as the space covered by a day's work, viz., 100 square miles.

"The British Empire presents a great field of operations for air survey. It has vast undeveloped and unmapped territories with great natural resources, which are gradually being utilised as time goes on. The need for maps or better maps is being felt in many quarters, and in many places the difficulties in the way of ground survey are very great.

"Canada has led the way in showing what can be done and how aerial surveys can be utilised, and other colonies are following her and seeking for information as to methods and apparatus. England is probably the least suitable part of the Empire for the practice of air survey, and even for experiment, but I think that she has played an honourable part in the development of the science still in its infancy, and I trust that in connection with this development the name of Major J. C. Griffiths will always be remembered."

* Professional Paper No. 19. Survey of India, 1920.

Commercial Air Transport.

UNDER the title, "Air Transport and Its Uses," Mr. G. Holt Thomas read a paper before the Institution of Electrical Engineers on March 3. Mr. Holt Thomas called attention to the value to a country of a fleet of commercial aeroplanes with their complement of engines, pilots, ground staff, etc., ready to be drawn upon in case of emergency. On the subject of commercial aviation, Mr. Holt Thomas expressed the opinion that over the long-distance routes of the future passengers, who at present provided most of the revenue, could be disregarded, as no passenger would care to fly 5,000 miles straight off. There was, however, no reason why 20 different pilots should not fly, on 20 separate stages, distances to make up the 5,000 miles, or even the 10,000 or 12,000 miles that separated us from Australia. On the London-Sydney route Mr. Holt Thomas estimated that the cost of air transport would be 3s. per ton-mile. He estimated the cost of carrying a letter by air to Australia at 1s. While he was entirely in favour of the Burney scheme, he thought it would be a mistake not to explore Imperial mail communication by heavier-than-air craft, simply because the Burney airship scheme had been accepted in principle.

"Tony" Fletcher back.

MR. A. A. FLETCHER, at one time chief designer to the Central Aircraft Co., of Kilburn, and previously associated

with the L. & P. School of Flying at Hendon, not to mention his earlier work with Martinsydes at Brooklands, has now returned from Japan, where he escaped death during the earthquake by swimming a couple of miles out to sea to a vessel. Mr. Fletcher, or "Tony" Fletcher, as he was always called, lost all his possessions in the earthquake, escaping only with a portion of the clothes he wore when he started his "swim," but although he lost a number of valuable data, collected during many years of aeronautical engineering, he probably carries most of those that matter "in his head." "Tony," it may be remembered, went out to Japan about three years ago to give the Japanese a course of instruction in aircraft design. He was established at the Naval Aircraft Factory at Yokosuka (the Japanese "Portsmouth"), and his method of instruction took the very practical form of designing and building several aeroplanes and seaplanes, the pupils following the design and construction step by step, and later on watched the performance of the machines. Fletcher's three years' agreement was about to terminate at the time of the earthquake, and he consequently returned to England. He is now looking for a berth with an aircraft firm either at home or abroad, and as his experience is one dating back to the early days of flying it is to be hoped that his services will be made use of. If anyone interested will communicate with the Editor of *FLIGHT*, letters will be forwarded to Mr. Fletcher.

AIR DEFENCE IN THE LORDS

IN the House of Lords on March 4 the question of air defence was raised in a resolution by the Marquess of Londonderry to the following effect:—

"That this House, whilst earnestly desiring the further limitation of armaments so far as is consistent with the safety and the integrity of the Empire, affirm the principle laid down by the late Government, and accepted by the Imperial Conference, that Great Britain must maintain a Home Defence Air Force of sufficient strength to give adequate protection against air attack by the strongest air force within striking distance of her shores."

His lordship said that the terms of the motion were the same as those adopted by Sir Samuel Hoare in the House of Commons. The answer given to the late Secretary of State was of a most unsatisfactory character. He felt it was necessary to give Lord Thomson an early opportunity to clarify the situation and acquaint the country with the policy the Government were proposing to pursue. The motion was not designed as an attack on the Government, but their attitude, as defined by Mr. Leach in the House of Commons, had raised misgivings in his mind which he hoped the Secretary for Air would be able to remove.

The Marquess then referred to the necessity for a continuous air policy, to the late Government's policy and that of the Imperial Defence Conference, and to there being no hostility to any foreign Power in his words when making comparisons as to relative strength in the air. They wanted more than Mr. Leach's promises that there would be no change in past policy "for the present."

They required that the Government should accept not only the commitments but also the policy implied by them, and that they should recognise that these commitments were only the first stage of a considered and continuous policy of defence in the air, a policy which was not merely a British policy, but an Imperial policy, founded upon the recommendations of the Committee of Imperial Defence and endorsed by the resolutions of the Imperial Conference. The position of the Government as it stood under the utterances of some of its members was an impossible one. There were men associated with the Government and exercising varying influences over the Government who, if they had achieved their object during the period of the War, would have effectually brought about the defeat of the Allies, and the destruction for all time of the British Empire.

It was for this reason that the answer given in another place, to which he referred as unsatisfactory, inspired no confidence in his mind as regarded the attitude of the Government towards home defence. In view of the general agreement that the time had not come for disarmament, it was vitally necessary that they should have an assurance that the Government was alive to the necessity of a continuous policy in regard to air defence. Our present Air Force was deplorably insufficient. We had, roughly, one machine for every ten machines at the disposal of the strongest Power in the air today.

The Duke of Sutherland, supporting the resolution, referred to what he described as the remarkable speech made by Mr. Leach, the Under-Secretary for Air. Lord Thomson, the Secretary of State for Air, they found to be a very different type of person, judging by his pen. If they had read aright the views that Lord Thomson had expressed in a recent article, the motion would have his strongest support.

How did Lord Thomson propose to meet force by force, as he had said in his article, if he had only 100 aeroplanes to put against 1,000? What was the use of rattling the sabre if he could not draw it from its sheath when required? If the noble lord believed what he had written, he must ask for more than a one-Power standard.

Lord Gorell said he did not consider Mr. Leach's speech so unsatisfactory as the two noble lords who had spoken. He hoped that any attempt to limit air armaments would not mean placing impediments in the way of the extension of civil aviation.

Lord Thomson, Secretary for Air, in reply, said the resolution invited the House to affirm a principle which in point of fact was the assertion of the one-Power standard. It might easily, and he thought it would obviously, initiate a race of armaments. France was the strongest air force within striking distance of our shores. Why not be frank in this matter, because it was France we were talking about when we talked of schemes of expansion?

He wished to speak quite frankly. If he believed there was any need for the affirmation of this principle, or for the application of a rule-of-thumb, he would try to do far more

in the way of extending our air forces than had been done or was even contemplated by the last two Governments. He did not believe such a necessity existed, and, quite obviously, Sir S. Hoare did not think it existed; otherwise he would have provided sufficient strength, giving adequate protection, at a much earlier date. If the danger was there, why should it be more serious five years hence than it was today? The disparity was with us now; it had been with us since 1922. His predecessor, he believed, acted in a most practical and reasonable manner, and laid the foundations of a scheme of gradual expansion and development. With the first stages of that scheme of development the Government would not interfere, either directly or indirectly.

After explaining the attitude of the Labour Party toward the question of armaments, Lord Thomson said they did not dismiss lightly the possible dangers of the situation. They were fully seized of all the facts. What was more unfortunate was that in many parts of Europe the war spirit still survived. With regard to home defence, did any of their lordships imagine that the Labour Party, and especially the trade union leaders, were not fully seized of all the details of what he might call the home front? They did not forget the experience of the War, and least of all the air raids. The Government took all the features of the home front into consideration, and recognised that aviation had introduced a new form of war, which entirely altered the defence problem of Great Britain and deprived us of our first line of defence on the sea. They knew perfectly well that the people of this country would never countenance a Government which neglected to take proper precautions against a repetition of the horrors of the air raids during the War.

It was the irony of fate that they, who were scoffed at as pacifists, should be called on to give effect to a scheme of expansion in armaments which had been rendered necessary by the neglect of some, at least, of their predecessors. One hardly did justice to the working man of this country by calling him a pacifist.

The Labour Party, and, he hoped, the Labour Government, were possessed of considerable common sense. To most of them the common sense of this question was that for the present, and until general disarmament was possible, the policy of our country should be to make such preparations as would show the world that this country did not mean to be caught napping, and that we did not take our desires for realities. To develop our strength and to give the impression that we were mindful of our interests and responsibilities, we needed a home defence force of reasonable size; reserves of men and material; establishments for training and research, and a well-thought-out scheme of expansion. All this he found already existing in the Department over which he had the honour to preside. He had inherited an enthralling task in the direction of a service built up in the War years by an immense expenditure of blood and treasure, with a splendid record of enthusiasm and self-sacrifice. The machine existed, and it functioned admirably. Its activities included defence, research, and the fostering of every form of aviation. It was manned by enthusiasts, always seeking for new developments and ideas. It was essentially a national service, and would become, as time went on, a vital factor in the national life. It had points of contact with several highly skilled trades. It enrolled growing boys and gave them an all-round training, and sent them back to settled employment when they were 30 years of age as highly skilled mechanics, ready to play their part in a growing industry. In those things the Air Force commended itself to every thinking trade unionist in the country. Their lordships might rest assured that the scheme of home defence, initiated by the Coalition Government in 1922, and carried on by the late Government, would be continued without any interference with the administration that existed when the present Government came into office. On the contrary, he trusted measures would be taken to speed up research and civil aviation. Essential Bills of great urgency would shortly be presented to Parliament. The scheme would be worked out in definite stages without any break in the continuity of policy. He stressed the word "stages," and that might give rise to some misgivings, but he did so because if some such conference as that held recently at Washington should provide for an all-round reduction of armaments, we ought to be able and eager to take full advantage of its provisions.

In regard to civil aviation their ambition was equally distinct. It was to encourage the air habit in this country. Just as the Navy looked to the mercantile marine for its reserves in time of war, so they should build up a mercantile

air reserve consisting of men who thought and acted in three dimensions. Their policy was a common-sense one. Possibly their lordships might think the Government were attempting an impossible task when they endeavoured to make the strategy of Lord Londonderry go with the policy of the Labour Party; but they meant to continue the scheme of expansion, they would not interfere with it one jot or tittle for the present, but their policy was to prepare for peace. The Labour Party had great advantages in tackling this matter, and they would spoil their chances if they affirmed the principle contained in the resolution. There had never been a period in the world's history when an appeal to common sense and idealism had a fairer prospect of success. If we continued in the same old rut, accepted the same shibboleths, endorsed the law of force, millions of expectant people would be very disappointed. The Government were determined to give a fair trial to another method. Much patience would be required. Innumerable obstacles had to be overcome. A year hence their ideas might have to be revised. They might have to admit failure. But this endeavour was higher, more civilised, and infinitely more practical than embarking on a race of armaments.

The Marquess of Salisbury said there was an astounding difference in the atmosphere in which the Secretary of State and the Under-Secretary moved. He did not know how the two Ministers got on in the same office. The Secretary for Air was in favour of what he called a reasonable Air Force, fully equipped in every respect, which might be capable of being expanded, and said that the Government were going to rally on the policy of continuity. Then why did he not accept

the motion? There was, however, a note in his speech which was intended, perhaps, to appease some of the gentlemen who recently thought they were electing a pacifist Government.

The Lord Chancellor said that the Government's objection to the resolution was not to its substance, but to its form. It was equivalent to saying to France, "We are determined to build up such a force as will keep you off." The resolution a little embarrassed the Government, and they would rather be without it. The late Government consulted him about the form of our Air Force, and he entirely approved of the shape and the details. That plan held the field, because Lord Thomson was carrying on the work started by Sir S. Hoare, and in the same spirit. The policy of the Government was to keep armaments in a state of efficiency until other nations were willing to co-operate in the great policy which the Prime Minister was pressing at this very time of getting rid as quickly as possible of the tremendous burden which weighed down nations today. He repeated that there was no interference, direct or indirect, with the policy to which Lord Thomson had succeeded.

Marquess Curzon expressed satisfaction with the general statement of policy. He declined to believe for one moment that in reaffirming this resolution any cause of complaint would be given to our great neighbour, France. Rather would there be cause for misunderstanding if their lordships now receded from the position they formerly took up.

The resolution was challenged by the Ministerial representatives and the Liberals, but their opposition was not pressed, the resolution being carried without a division.



The Institution of Aeronautical Engineers

WE would remind our readers that on Friday, March 7 (tomorrow), Mr. L. Rowland will be reading his paper on "Braided Rubber Shock Absorber Cord for Aircraft" before the Institution at the Engineers' Club, Coventry Street, W.1 (at 6.30 p.m.). We understand the author has taken great pains to compile an interesting paper, and has prepared a very complete set of lantern slides and models showing the properties of rubber and the advantage of rubber shock absorbers.

Belfast-Manchester Air Service.

THE Belfast Corporation has approved the purchase, at a cost of £14,000, of 54 acres of land at Malone, just outside Belfast, as a site for an aerodrome in connection with the proposed air service between Belfast and Manchester, which it is hoped will be started this Easter.

MacLaren Round World Flight.

It is announced that the flight round the world attempt to be made by Squad-Ldr. A. S. MacLaren, Flying Officer W. N. Plenderleith and Flt. Serg. Andrews will, it is hoped, start on April 15th next. A Vickers' Amphibian machine will be used.

A Correction.

AN error occurred in the De Havilland Aircraft Co.'s advertisement which appeared in our issue for February 28. In this the distance between Charleville and Cloncurry, on the Australian air line, was given as 385 miles, instead of 585 miles.

"Wakefield" Scholarships

THE Air Ministry announces that the Wakefield Scholarships awarded to cadets entering the R.A.F. (Cadet) College in January, 1924, have been gained by Mr. A. W. B. Hale, who passed into the College as a result of the competitive examination held in November last, and Mr. H. D. Spreckley. The latter was selected from amongst the aircraft apprentices who were chosen to proceed to the Cadet College after completing, in December last, their three years' course at the R.A.F. training schools for aircraft apprentices.

It will be remembered that in 1920 Sir Charles Wakefield, Bart., C.B.E., generously offered to provide two scholarships per annum, each of the annual value of £75, and tenable for two years, with a view to giving financial assistance to successful candidates for entry into the R.A.F. (Cadet) College, whose parents are in reduced circumstances. Sir Charles has now kindly extended the period of his offer for a further three years under revised conditions. Under the new conditions four scholarships, each of £75 but tenable for one year only, are offered per annum, two for each half-yearly entry. One of these is given for competition at the open competitive examination held in June and November for admission to the R.A.F. (Cadet) College, and one to the top boy of the aircraft apprentices who are specially selected for cadetships twice

a year at the end of their three years' training as aircraft apprentices.

The first scholarships under the revised terms have been awarded as above.

Lake Down Aerodrome to be Abandoned

THE Air Ministry informed the Railway and Canal Commission Court on February 21 that they had decided to abandon Lake Down Aerodrome on Salisbury Plain and the R.A.F. Camp at Blandford, the boys' school on the latter place being removed to Chesham. Biggin Hill (Kent) Aerodrome would be purchased if negotiations were successful, as would also the land on which Bordon Camp stood. The Aircraft School at Biggin Hill cost £435,000.

Viscount Cecil on Poison Gas from the Air

ON February 22 Viscount Cecil probably made the "flesh creep" for many of 2 L.O.'s listeners when he broadcast a talk on "Europe in Arms," in which he described various forms of poison gases and their effects. He also explained how, in the next war, poison gas might be employed against civilians by means of raiding aeroplanes.

New Air Lines in Czecho-Slovakia

It is reported that a new private company, with a capital of 10-15 million crowns, and subsidised by the State, is to be formed in Czecho-Slovakia. This company proposes to operate the following air routes:—Prague-Brono, Prague-Bratislava, Brono-Krakow, Bratislava-Pitstana, Bratislava-Budapest-Zagreb-Trieste, and Bratislava-Kosice-Cernovica-Kiev.

Fiat Engine Withdrawn from French Competition

WE learn that the Fiat aero engine which was entered for the 240-hour endurance test for aviation engines, organised by the Aero Club of France, has been withdrawn. One of the most distinguishing features of the Fiat engine prepared for this competition is the use of a supercharger driven from and forming an integral part of the power plant, by means of which the power output is constant whatever the altitude of flight. Under the rules of the French competition the engines have to be tested on the bench at practically sea level, and to meet this requirement necessitated several modifications in the Fiat design, which the Fiat Co. have been unable to accomplish in the time available. It is understood, however, that the new Fiat supercharger aviation engine will be seen in the endurance trials to be held in a few months' time by the Italian Government, under the rules of which account is taken of the constancy of the power output at varying altitudes.

Banking—By Aeroplane

It is reported from Washington that as a result of a run on a bank, several hundred miles from Washington, an appeal was made to the Federal Reserve Board, which rushed some half a million dollars in notes to the bank by aeroplane.

THE ROYAL AIR FORCE

London Gazette, February 26, 1924

General Duties Branch

The following Pilot Officers are promoted to rank of Flying Officer (February 16): L. K. Barnes, W. L. Dawson, C. H. A. Stevens, C. B. R. Pelly, S. G. Connolly, G. H. Huxham, D. L. G. Bett, C. B. B. Maturin, C. S. Riccard, E. A. Healy, E. B. Forster. Flight Lieut. R. H. Portal, D.S.C., is granted hon. rank of Squadron Leader on promotion to rank of Lieut.-Commr., R.N. (Feb. 15).

The following are placed on half-pay: *Scale A.*—Group Capt. R. Gordon, C.B., C.M.G., D.S.O. (Feb. 16). *Scale B.*—Flight Lieut. H. J. Edgar (Feb. 13).

Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., is restored to full pay from half-pay (Feb. 26); Flying Officer H. G. Sullivan relinquishes his short service commn. on account of ill-health contracted in the service, and is permitted to retain his rank (Feb. 29); Flying Officer C. Douglas relinquishes his short-service commn. on account of ill-health contracted in the service (March 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

Stores Branch

Flight Lieutenant: A. G. Knight, M.B.E., to No. 2 Wing H.Q., India. 22.12.23.

Flying Officers: E. V. E. Andrewartha to No. 27 Sqdn., India. 22.12.23. E. W. Lawrence to No. 56 Sqdn., Biggin Hill. 25.2.24. W. H. Bowden to R.A.F. Depot on transfer to Home Estab. 22.1.24.

Flying Officers: P. H. Burt, to Central Flying Sch., Upavon. 25.2.24. W. T. Lewis, to Electrical and Wireless Sch., Flowerdown. 25.2.24. G. Scarrott, to Sch. of Tech. Training (Men). Manston. 25.2.24. E. A. Burridge, to Aeroplane Experimental Establ., Martlesham Heath. 25.2.24.

Medical Branch

Capt. C. T. Hastings, Army Dental Corps., is granted a temp. commn. as Flight Lieut. on attachment for duty with R.A.F. (Feb. 1). He will continue to receive emoluments from Army Funds.

Reserve of Air Force Officers

J. A. A. Barber is granted a commn. as Flying Officer on probation in Class A, General Duties Branch (Jan. 29) (substituted for *Gazette* Jan. 29).

The following are granted commns. on probation in General Duties Branch in the ranks stated (Feb. 26):—

Class A. Flying Officers.—J. N. Ogilvie, H. Soulsby.
Class A. Pilot Officers.—P. A. Cox, G. G. Matthews, J. M. S. Taylor, V. Vickers, P. J. Waller, G. G. Williams, G. V. Yorke.
Class A.A. Pilot Officer.—W. Rogers.
Class B. Flying Officer.—S. P. Scott.

The following officers are confirmed in rank with effect from the dates indicated: *Flying Officers:* B. S. Wilcox, D.F.C. (Jan. 30); H. C. Cooke, H. D. Davis, A.F.C., H. E. Duncan, and C. H. Howitt (Feb. 21). *Pilot Officers.*—W. L. Woodward and W. R. Bannister (Jan. 30); W. A. Hammerton (Feb. 21).

Pilot Officers: C. W. Gore, to No. 1 Flying Training Sch., Netheravon. 25.2.24. M. W. Keay, to No. 111 Sqdn., Duxford. 25.2.24.

Medical Branch

Squadron Leader P. T. Rutherford, O.B.E., to Egyptian Group H.Q. 30.1.24.

Flight Lieutenants: H. E. Flavell (Dental), to No. 1 Sch. of Tech. Training (Boys). Halton. 28.2.24. E. G. S. Hall, M.B., to No. 208 Sqd., Egypt. 25.1.24. E. A. Lumley, M.C., M.B., to Aircraft Depot, Egypt. 2.2.24. A. E. Barr-Sim, M.B., to Baghdad Combined Hospital, Iraq, instead of to Hqrs., Iraq Command, as previously notified. 27.1.24.

Pilot Officers: L. G. Pinnell and B. H. Shaw, both to No. 5 Sqdn., India. 29.12.23. A. S. Hutton and G. H. Rawlinson, both to No. 60 Sqdn., India. 25.1.24.

IN PARLIAMENT

Civil Aviation and Subsidy-Earning Flights

MR. A. T. DAVES, on February 26, asked the Under-Secretary of State for Air how many miles have been flown under the present subsidy arrangements by companies operating in connection with civil aviation; what amount has each such company received for the miles flown by its machines; whether any company has received the full subsidy notwithstanding that the number of miles stipulated by the Ministry has not been flown; whether it is the rule of the Ministry to pay a *pro rata* amount should the full number of miles stipulated not have been flown; and, if so, why has the general rule been varied in a particular case or cases?

MR. LEACH: The aggregate distance flown on subsidy-earning flights from October 1, 1922, when the present system of subsidy was adopted up to January 31 last, was 888,621 miles, and the total amounts paid to each company to the same date were:—

British Marine Air Navigation Co., Ltd., £3,846 3s. 4d.

Daimler Hire, Ltd., £69,807 13s. 8d.

Handley Page Transport, Ltd., £26,927 12s. 9d.

Instone Air Line, Ltd., £39,775 3s. 9d.

The answer to the third part of the question is in the negative, but in two cases subsidy payments have been suspended since the beginning of January last. As regards the fourth part, the system of payment is that the Air Ministry issues each fortnight a sum equal to one-twenty-sixth of the total subsidy for a yearly period, or one-thirteenth of that for a half-yearly period, and makes at the end of the period in question the necessary adjustment to secure that the total amount paid is proportionate to the actual mileage flown. As regards the last part of the question, I am not aware of any variation from the general rule, but if the hon. member will supply me with any information of which he may be in possession I will have full inquiry made.

Air Defence

SIR F. HALL asked what were the numbers of persons killed or injured by the action of enemy aircraft in this country during the Great War; what was the number of aircraft available for home defence at the time of the Armistice; what is the number now available; and what proportion of these were designed and constructed subsequent to 1919?

MR. LEACH: The answer to the first part of the question is 1,413 killed and 3,407 injured. The first line strength of the squadrons allotted to home defence at the time of the Armistice was 348 aeroplanes; the corresponding figure at the present time is 76 aeroplanes. The machines at present in use are drawn almost entirely from the very extensive stocks which had been accumulated at the date of the Armistice and which have since been largely re-conditioned. Considerable orders for machines of new design have, however, recently been placed.

R.A.F. Commissioned Officers.

LIEUT.-COMMANDER KENWORTHY on February 28 asked the Under-Secretary of State for Air what is the total number of commissioned officers borne on the active list of the Royal Air Force; how many of these are held to be competent to fly and instantly available for flying; and how many carry out regular duties in the air?

MR. LEACH: The answer to the first part of the question is 3,136. This includes 657 officers of stores, accountant, medical and other non-flying branches, and 160 ex-warrant officers of the Royal Naval Air Service. The answer to the second part of the question is 1,980, if officers under flying training are included. There are 1,703 fully qualified pilots. Qualified pilots who are permanently unfit are excluded from these figures. The answer to the last part of the question is, that all officers of or below the rank of wing-commander, who have qualified as pilots and are medically fit to fly, carry out regular duty in the air sufficient to maintain them in constant flying practice.

London-Prague Air Service.

LIEUT.-COMMANDER KENWORTHY asked what is the present position with regard to the air-transport treaty between this country and Czechoslovakia; and what is delaying the start of civilian transport by air to Prague from England?

MR. LEACH: The ratification of the temporary air traffic agreement referred to has, in accordance with the provisions of the agreement, been forwarded to His Majesty's representative at Prague for exchange against a similar

instrument to be executed by the President of the Czechoslovak Republic. It has not yet been possible, as desired by both Governments, to commence an air service between London and Prague under this agreement on account of the action of the German Government in withholding their consent to the operation of the service over that part of the route which lies within German territory.

LIEUT.-COMMANDER KENWORTHY: Can the hon. member say what steps are being taken to get the consent of the German Government to our flying over German territory?

SIR H. BRITAIN: Has not this matter been held up for over a year, and are not the people of Prague anxious to get this air service between Prague and London?

MR. LEACH: There are certain disabilities placed upon German aircraft development, and they are raising similar difficulties wherever possible to put upon other nations who want to fly over their territory. The whole question is being discussed with a view to removing these difficulties as soon as possible.

Air Expenditure by France.

COMMANDER BELLAIRS asked the Under-Secretary of State for Air if he can give the approximate total expenditure of the French Government on army, navy and civil aviation as provided in the latest estimates?

MR. LEACH: The French Budget credits for the year 1924 are understood to be for the Army (including Colonial) aviation, 421,287,639 francs; for Navy aviation, 105,540,081 francs; and for the aviation services, including civil aviation subsidies, administered by the Under-Secretary of State for Air in the Ministry of Public Works, 138,463,350 francs. In addition, a proportion of the provision for general services of the Army and Navy is to be attributed to the requirements of naval and military aviation. Whilst it is not possible to estimate this proportion with accuracy, it is clear that it represents a very substantial amount and that the actual total expenditure on naval and military aviation in France is therefore materially in excess of the figures given above.

COMMANDER BELLAIRS: Will the Ministry direct the attention of the Chancellor of the Exchequer to the fact that, for about one-third of the expenditure which we incur, France gets about 10 times the strength?

MR. LEACH: No doubt the hon. and gallant member knows that there are very good reasons for that.

Airships.

COMMANDER BELLAIRS asked whether any estimate has been formed as to the relative cost to the country of proposals for nationalised building and equipping airship routes, rendering equivalent service, as compared with the subsidy proposals of the Burney airship scheme, excluding all losses from income tax which would have been levied and from absence of orders to build for foreign countries; and, if so, can he give the comparative figures?

MR. LEACH: As stated by the Prime Minister on Monday last, a special Sub-Committee of the Cabinet has been appointed to examine and report on the airship question. I am unable to say whether the problem will present itself to the Sub-Committee in such a way as to entail the preparation of estimates of comparative costs based on equivalent services under two different schemes. No estimates of the sort are in existence.

American Attempt at Flight Round the World.

SIR H. BRITAIN asked the Under-Secretary of State for Air whether he has any information with regard to the proposed American attempt to fly round the world; whether he will obtain a report from the attaché at Washington as to the number of "planes" which will make this attempt; and whether the Government of the United States is supporting this enterprise?

MR. LEACH: The Air Ministry has received full information of the proposed world-flight referred to, and has been in communication with the American air authorities in regard to the arrangements for those parts of the flight which will be over British territory. It is understood that four or five machines of the United States Army Air Service will take part in the flight, which will be carried out by serving officers with the full support of the United States Government.

SIR H. BRITAIN: Seeing that such flight, if successful, will do very much for American prestige and the development of civil aviation in the United States, will the hon. gentleman promise the same support as that which the United States has given to British attempts made here?

AIR POST STAMPS

By DOUGLAS B. ARMSTRONG
By Air Post to the Pole

AN American correspondent sends me one of the souvenir postcards to be carried on Amundsen's impending Trans-Polar Flight Expedition, to which previous reference has been made in this column. It is a small-sized card bearing upon the one side the printed address of the expedition's headquarters at Christiania, with a space for a 2 cents postage stamp. On the reverse is the impression of a private stamp in green, together with the inscription, "North Polar Mail," and provision for the address as well as the name of the sender. The design of the special stamp consists of a map of the Arctic Circle with an aeroplane flying over, in traverse oblong format. At the top is the inscription, "Trans-Polar Flight Expedition, Christiania, Norway," and at the foot, "In commemoration of Amundsen's Trans-Polar Flight, 1924." Printed by the American Bank Note Company, of New York, these cards are being sold for \$1 each by certain of the big American stores in aid of the funds of the expedition, and a notice issued by the Second Assistant Postmaster-General states that:—

"In accordance with arrangement made with the Norwegian postal administration private postcards issued in commemoration of the proposed flight of Capt. Roald Amundsen's airplane over the North Pole will be accepted in this service when postage paid 2 cents by a United States stamp affixed, even though Norwegian postage stamps to pay the postage from Christiania to the United States by the North Pole route may, in some instances, also be affixed.

"Care must be taken in distributing the cards to see that they are despatched to Norway via New York prior to the time when they may be again received in this country over the North Pole route, probably through the post office at Seattle."

The souvenir cards accumulated at Christiania prior to the departure of the expedition will be handed in on the return journey to the Norwegian postal agency at Spitzbergen, and thence forwarded to their destination, postage being paid in current stamps of Norway in addition to those of any other nation which they may bear. A distinctive cancellation will likewise be employed.

Montevideo-Buenos Ayres Air Post.

THIS service now functions daily, leaving Buenos Ayres at 11.45 a.m. and arriving at Montevideo between 1 and 1.15 p.m. The return flight departs from the Uruguayan capital at 1.45 p.m., reaching the starting point on the Argentine littoral at 3 to 3.15 in the afternoon. Letters must be franked with the special "Correo Aereo" stamps described in our last number, in accordance with the following tariff:—

Not exceeding 20 grammes, 6 centesimos.

Not exceeding 50 grammes, 10 centesimos.

Not exceeding 100 grammes, 20 centesimos.

We learn that 50,000 copies of the 6 centesimos blue, 30,000 of the 10 centesimos red, and 20,000 of the 20 centesimos green have been printed by the Imprenta Nacional at Montevideo.

Unique "R.34" Letter (?).

WHAT is probably the only private letter carried by the dirigible "R.34" on its outward voyage from England to America has lately changed hands for a considerable sum. The writer of this letter had planned to stow away on the airship, but his plans being frustrated, entrusted it to one of the crew, by whom it was dropped overboard when passing over Nova Scotia. It was picked up in a field some months afterwards and taken to the local post office, where it was endorsed by the postmaster with particulars of the circumstances under which it was found, and duly delivered to the addressee, a lady living in a South London suburb. The envelope is much damaged by exposure, but bears the super-scription, "Per H.M. Airship 'R.34,'" and the amount of postage collected on delivery, viz., 3d. It is undoubtedly a most interesting relic of the famous flight, as practically all other letters carried on the outward trip were of an official character.

Aerogrammes.

AN air post service has been instituted between Constantinople and Angora, but no particulars are yet to hand as to the special stamps or cachets used, if any.

In addition to the commemorative series recently foreshadowed, two definitive air post stamps in denominations 15 and 30 centavos are being printed in London to the order of the Bolivian Government.

The curious designs of the latest Lithuanian air post stamps are the work of the native artist Buratschus, and they are printed in sheets of 50 at the Public Printing Office, in Kowno. Out of the total issue, comprising 400,000 sets, one-eighth of the stamps are to be surcharged and sold for double their face values in aid of the Red Cross in Lithuania.

SOCIETY OF MODEL AERONAUTICAL ENGINEERS
"MODEL ENGINEER EXHIBITION" awards have been received by the following members: S. C. Hersom, silver medal; C. A. Rippon, bronze medal; B. K. Johnson, diploma; F. de P. Green, diploma.

Anyone interested in aeronautical research should communicate with Mr. W. E. Evans, hon. secretary, Research Committee, 20, Thurlby Road, Wembley.

Thursday, March 13, Dr. A. P. Thurston will give a lecture on "The Evolution of Aeronautical Science" (illustrated by lantern slides) at headquarters, British Empire Room, Y.M.C.A., Tottenham Court Road, London, W.C.1, at 7.30 p.m.

Members are requested to bring a friend.

A. E. JONES, Hon. Sec.

PUBLICATIONS RECEIVED

Ford Electrical Equipment: The Ford Starter, Ignition and Lighting Systems. By R. T. Nicholson, M.A. Second Edition. London: Temple Press, Ltd. Price 2s. 6d. net. By post 2s. 9d.

Note Technique di Aeronautica: February, 1924. Commissariato dell'Aeronautica Intendenza Generale. R. Accademia Nazionale dei Lincei, Rome.

Notiziario di Aeronautica, No. 2, February, 1924. Commissariato dell'Aeronautica Intendenza Generale. R. Accademia Nazionale dei Lincei, Rome.

Ballière's Popular Atlas of the Anatomy and Physiology of the Human Body. London: Ballière, Tindall and Cox, 8, Henrietta Street, Covent Garden, W.C. Price 6s. net.

Le Danger Aérien Allemand. L'Écho de Paris, 16, Rue du Croissant, Paris. Price 40c.

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